PEACE/WILLISTON
FISH & WILDLIFE
COMPENSATION
PROGRAM

BC hydro

BRITISH
COLUMBIA

Fish Stocking Assessment of Dina Lake # 3, 2001

R. J. Zemlak and D. M. Cowie
January 2004

PWFWCP Report No. 282

The Peace/Williston Fish & Wildlife Compensation Program is a cooperative venture of BC Hydro and the provincial fish and wildlife management agencies, supported by funding from BC Hydro. The Program was established to enhance and protect fish and wildlife resources affected by the construction of the W.A.C. Bennett and Peace Canyon dams on the Peace River, and the subsequent creation of the Williston and Dinosaur Reservoirs.

Peace/Williston Fish and Wildlife Compensation Program, 1011 Fourth Ave. 3rd Floor, Prince George B.C. V2L 3H9

Website: *www.bchydro.bc.ca/environment/initiatives/pwcp/*

This report has been approved by the Peace/Williston Fish and Wildlife Compensation Program Fish Technical Committee.

Citation: R.J. Zemlak and D.M. Cowie. 2004. Fish stocking assessment of Dina Lake # 3, 2001. Peace/Williston Fish and Wildlife Compensation Program Report No. 282. 14pp plus appendices.

Author(s): Randy J. Zemlak[1] and Dawn M. Cowie[1]
Address(es): [1] Peace/Williston Fish and Wildlife Compensation Program, 1011 Fourth Ave., 3rd Floor, Prince George, B.C. V2L 3H9

105-02337/

DINA LAKE #3

WATERSHED: Parsnip River

DATE OF SURVEY: September 19 and 20, 2001

FIELD CREW LEADER: Randy J. Zemlak

FIELD ASSISSTANT: Arne R. Langston

PEACE/WILLISTON FISH AND WILDLIFE COMPENSATION PROGRAM

B.C. HYDRO

GENERATION

and

MINISTRY OF WATER, LAND and AIR PROTECTION

ENVIRONMENTAL STEWARDSHIP DIVISION

REPORT PREPARED BY: RANDY J. ZEMLAK
DAWN M. COWIE

INTRODUCTION

Dina Lake #3, located near Mackenzie BC (Figure 1), is a small lake southeast of Dina Lake #1 in the Dina Lakes chain. In 1992, a standard fisheries baseline reconnaissance level survey of Dina Lake #3 was conducted by the Peace/Williston Fish and Wildlife Compensation Program (PWFWCP) (McLean 1992). No game fish were identified and it appeared suitable for fish introductions (with the intent of creating a recreational fishery). BC Environment then developed a Fisheries Management Plan in February 1992 for the Dina Lakes chain (Jesson 1992). Rainbow trout were deemed a suitable game fish for introduction in Dina Lake #3. The above reports can be viewed at the PWFWCP office (address on cover page).

Viable rainbow trout have been stocked in Dina Lake # 3 since 1992. After a few years, it was decided that the only inlet stream should be enhanced to help alleviate any spawnbound problems these stocked fish may have. In 1996, with the assistance from volunteers from the Mackenzie Rocky Mountain Riders, Program biologists enhanced the inlet creek through the addition of spawning gravel. This was completed by transporting 150 bags of spawning gravel into the lake during the winter months and returning in the spring to excavate the channel to improve flows and access, then placing the gravel. Woody debris and brush was then placed over the channel to help provide some cover from predators such as eagles and bears.

During September 2001, PWFWCP fish biologists re-investigated Dina Lake #3 primarily to evaluate the success of the current fish stocking program and to determine if changes to the stocking program were required.

LAKE LOCATION

Location:	25 km north/northwest of Mackenzie BC'
Elevation:	± 693 m
Latitude/Longitude:	55° 31' 24" : 123° 17' 00"
U.T.M.:	10.0482112.6153066 (NAD 1983)
Management Unit:	7-30
N.T.S. Map No.:	93 - O/11
Waterbody Identifier:	00357PARA
Lake Drainage:	internal drainage

ACCESS

Although access to Dina Lake # 3 has not changed significantly since the original reconnaissance level lake inventory (1992), exact road directions and conditions have changed over time. From the Alexander Mackenzie Hotel in Mackenzie (0.0 km), drive north on the Mackenzie Boulevard/Finlay Forks Forest Service Road. At 0.4 km, drive straight through the 4 way intersection. At 7.5 km, the road changes from a two lane paved road to a two lane gravel (2wd)

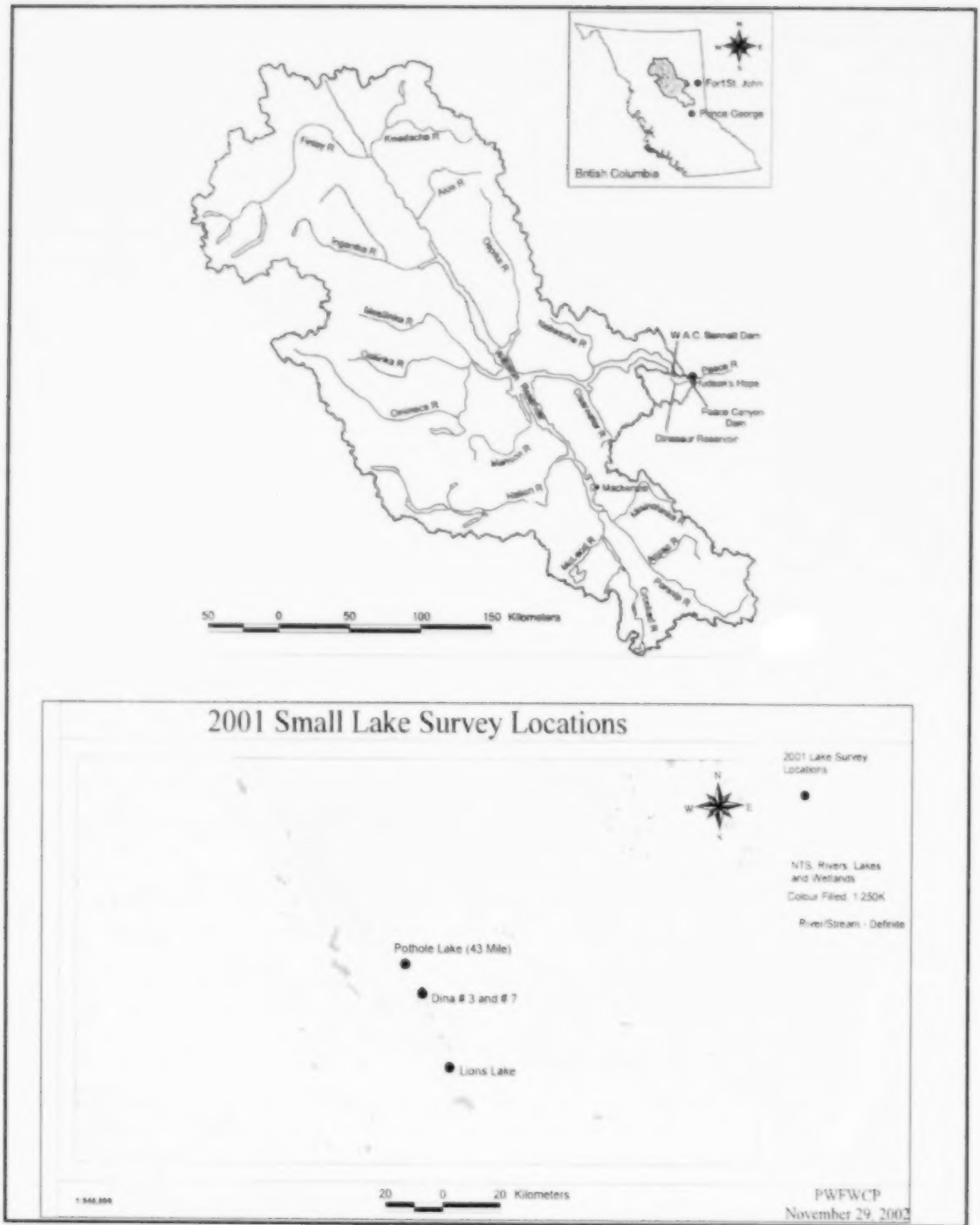

Figure 1. Location of Dina Lake #3.

road. At 8.4 km, cross Morfee Creek bridge. At 9.5 km, there is a four way intersection. Stay straight on the Parsnip West Forest Service Road. At 10.0 km, cross the Mugaha Creek bridge. At 10.4 km, stay right at this three way intersection. At 15.8 km, cross Tutu Creek bridge. At 19.7 km, go straight, do not go right on the Tony Creek main line road. At 20.4 km, cross Tony Creek bridge. At 21.8 km, stay straight (road on left goes to Heather Lake). At 27.8 km, cross a small culvert (inlet to Dina Lake # 3). At 28.3 km, turn left onto Dina Lake # 3 parking area. From here, an old deactivated road leads to Dina Lake #3. Vehicle access is not possible pass this point as the entrance has been dug out. Dina Lake #3 is approximately a 20 minute walk from the parking area.

STOCKING HISTORY

Rainbow Trout

Dina Lake #3 was initially stocked with 5,000 rainbow trout in 1992 (Table 1). According to the Release Records Database (MWLAP), rainbow trout are the only species of fish stocked in Dina Lake #3. The stocking program for this species has been relatively consistent (although not stocked annually) in terms of numbers. Roughly 2,500 fish are put into Dina Lake #3 every second year. These fish are mainly yearling size fish.

Table 1. Dina Lake #3 rainbow trout stocking history.

Year	Number	Size (g)	Life Stage	Stock
1992	5,000	0.9	fry	Dragon
1993	2,500	2.9	yearling	Tunkwa
1994	2,500	10.4	yearling	Tunkwa
1996	2,500	6.0	yearling	Badger tunkwa
1998	2,500	6.9	yearling	Badger tunkwa
2000	2,500	8.4	yearling	NRT Premier

A total of 17,500 rainbow trout have been stocked in Dina Lake # 3 over the last nine years. The average size of these fish has been 5.9 g.

METHODS

Four different techniques were used to determine relative abundance of fish species in the Dina Lake #3 system. Conversations with MWLAP fish biologists prior to the gill netting effort suggested that it would be valuable to have at least 10 fish sampled from each age group to accurately provide future recommendations to the stocking program. Therefore, it was deemed necessary to keep the nets in the water overnight. Two sinking monofilament experimental gill nets were set overnight. Net one consisted of six different sized mesh panels ranging from 25 to 85 mm. Each panel is 15.24 m long and 2.4 m wide. A second net was used consisting of one panel, 19 mm mesh. This small panel was used to try and find smaller sized fish species that may not have been captured in the original inventory. A second capture technique was the use of

Gee traps. The third method used was smal aquarium dip nets which were employed only in the inlet stream. The fourth technique used was angling gear. A spin cast rod with an assortment of lures and a fly rod with dry flies were utilised. On-site anglers were interviewed and catch per unit effort (CPUE) was recorded. Angling efforts by PWFWCP fish biologists were also recorded to determine additional CPUE.

The rainbow trout captured were measured for fork length (mm) and weight (g). A biological examination of the fish was conducted which revealed its sex, maturity, stomach contents, and disease/parasite presence. Scale samples were collected for age determination and analysis was performed by North/South Consultants (NSC). General appearance of the fish was determined through visual analysis. Photos of fish were taken but are not presented in this report and can be viewed at the address on the cover page. Mean lengths and weights were determined for each age class of rainbow trout. Condition factors ($\text{Weight(g)/Length(cm)}^3 \times 100$) were determined for each individual fish and for each age class. Lake chub, the only other species caught, were enumerated and general appearance of these fish was observed and recorded.

The habitat features of Dina Lake # 3 were briefly assessed. The entire perimeter of the lake was observed to confirm the one inlet stream and the lack of an outlet stream. The benchmark set during the original study (1992) was located. As the tree appeared to be dead, a new benchmark was established on the same shore. Changes to the current water level was measured with an Abney level, 1.5 m staff, and a 30 m Eslon tape. Photo documentation was taken of the lake habitat and are on file at the PWFWCP office.

A limnology station was established to profile the water temperature and dissolved oxygen at varying depths. A YSI model 58 oxygen/temperature meter was used for this limnological profile. Depth, oxygen, and water temperature were recorded at the surface to the bottom, at 1 meter intervals. Time and weather conditions were also recorded.

RESULTS

Gill Nets

Four net sets (Figure 2) were completed on September 19 and 20, 2001 and yielded rainbow trout (Table 2) and sparse numbers of lake chub (Appendix 1). The nets were checked periodically throughout the day but contained few fish. Gill net # 1, set for 5.4 hours, produced 14 rainbow trout. Gill net # 2, set for 22.18 hours, produced 1 rainbow trout and 1 lake chub. Gill net # 3, set for 3.45 hours, produced 4 rainbow trout. Gill net # 4, set for 3.52 hours, produced 6 rainbow trout. The average CPUE)for these gill nets was 1.04 fish/hour. All 36 rainbow trout were sampled to determine their current condition and growth rates.

The largest fish captured measured 54.7 cm in length and weighed 1,688 grams. This fish was also aged the oldest at 8 years old.

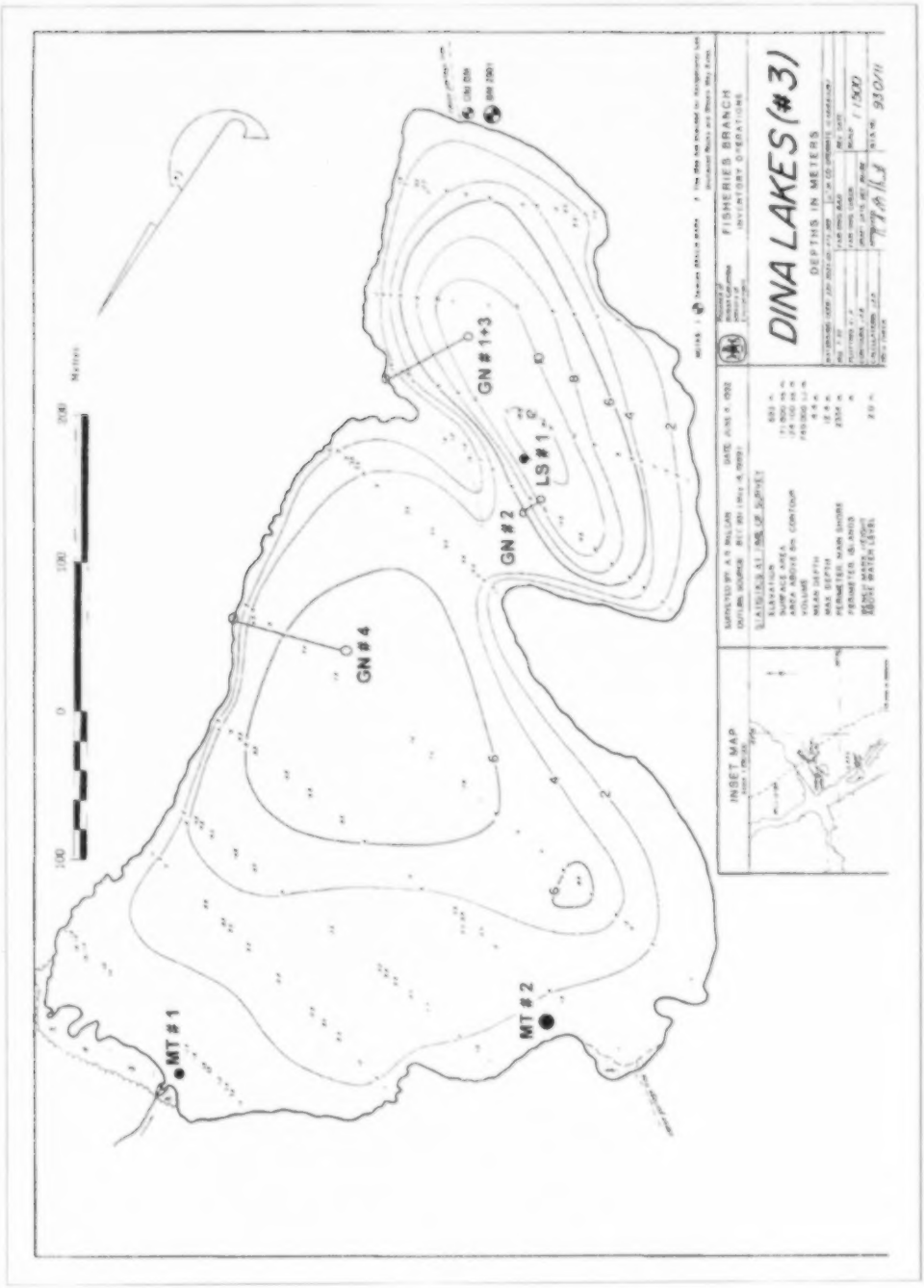

Figure 2. Location of gill net sets, Gee trap locations, benchmark, and limnology station.

Table 2. Gill net catch summary for Dina Lake # 3, 2001.

Date	Species	Net Set Number				Total	Number Sampled	Number Preserved	Size Range (cm)
		1	2	3	4				
Sept 19	RB	X				14	14	0	24.4 – 54.5
Sept 20	RB		X			1	1	0	24.5
Sept 20	RB			X		4	4	0	25.3 – 41.1
Sept 20	RB				X	6	6	0	13.4 – 40.0

Of the 36 fish captured, all were examined to determine sex and maturity: there were eight immature males, eight immature females; eleven maturing males, eight maturing females; and one female with ripe eggs. Age determination for all of the rainbow trout was determined by NSC (Appendix 2). Prints of the scales and age markings were provided for each fish, and reviewed by PWFWCP fish biologists. There were some age discrepancies identified with the samples taken. Few fish did not have a clear annulus. This same problem has been described before by Lentsch and Griffith (1987). In the event of a discrepancy in ages between NSC and PWFWCP biologists, the age determined by PWFWCP biologists was used based on the knowledge of the lake and its stocking history.

Analysis of the ages (Table 3) revealed that the majority of rainbow trout captured were in 3 age classes (2-4). Age classes 1, 5, and 8 produced only single fish sample sizes. Condition factors were then calculated (Table 4). The average condition was 1.02 indicating healthy fish for the 36 fish sampled. There was no obvious signs of stunting in the sub sample of fish captured.

Table 3. Population characteristics of rainbow trout in Dina Lake # 3, 2001.

Age Class	Sample No.	Mean Length (cm)	Range of Length (cm)	SD for Length	Mean Weight (g)	Range of Weight (g)	SD for Weight
1	1	13.4	-	-	22	-	-
2	13	26.0	15.1-34.1	4.4	193.3	35-371	79.7
3	9	32.1	27-39.5	4.3	353.9	201-566	129.5
4	11	40.2	29.5-48.5	4.6	676.6	269-1155	223.3
5	1	37.5	-	-	430	-	-
8	1	54.5	-	-	1688	-	-

Table 4. Condition factors for rainbow trout captured in Dina Lake # 3 in 2001.

Condition Factor	2001 Survey Results
Number of fish	36
Mean C.F.	1.02
Minimum C.F.	0.82
Maximum C.F.	1.18
Standard Deviation	0.08

Condition factors were then separated, by sex, for the entire sample. The sex ratio was close to 1:1 as 17 females and 19 males were captured. These values were plotted versus fork length (Figure 3).

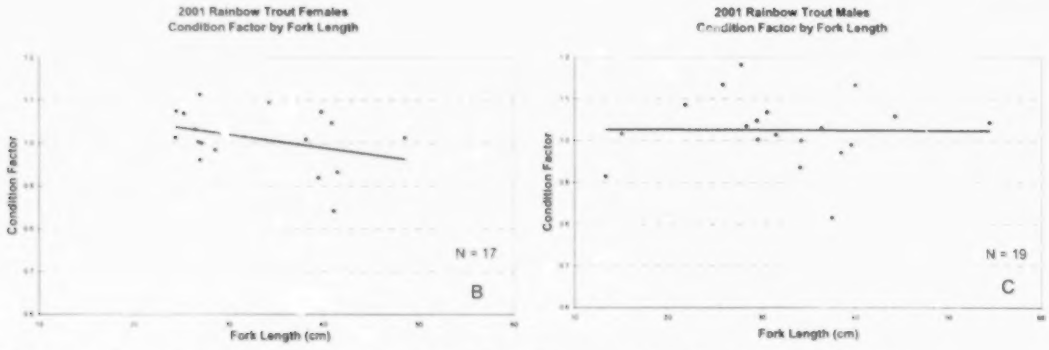

Figure 3. Condition factor by fork length of rainbow trout in Dina Lake # 3, 2001.

Both female and male rainbow trout showed slightly different conditions as they got larger. The female fish appear to average smaller condition factors as they get bigger while the male fish appear to retain a constant average condition (slightly over 1.0) as they get bigger. The exact reason why the female fish show a slight downward trend in condition as they get older is uncertain. One possible reason may be that of the few females that had condition factors around 0.9 had spawned in this sample year and that they are in the process of fattening up.

There was a wide range in conditions (0.82 to 1.18) for the range in ages (Figure 4). Most of the range in conditions occurred as the fish got older in the females while more range of the conditions occurred at a younger age for the males. Overall, both sexes showed a slight downward trend in condition (i.e. getting skinny) as they aged. Exact reasons why this may be happening is uncertain. This may be due to only a few fish that had low condition factors (around 0.8) and will ultimately skew the trend downwards. The food resources in Dina Lake #3 appear to be adequate but have never been quantified.

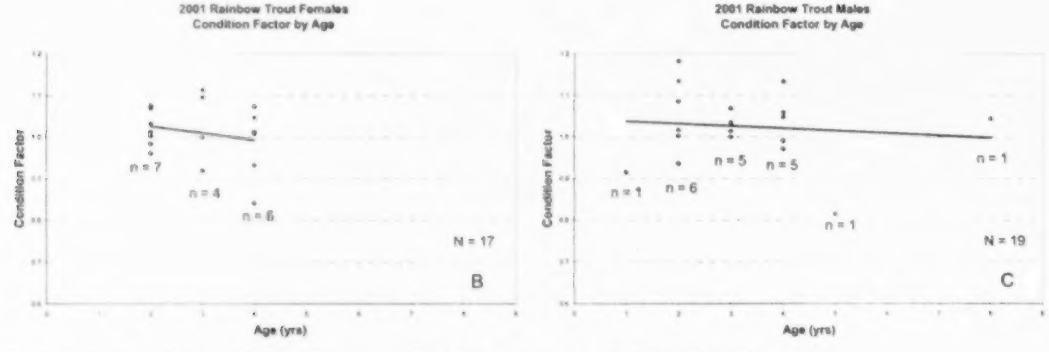

Figure 4. Condition factors by age of rainbow trout in Dina Lake # 3, 2001.

Dina Lake #3 rainbow trout appear to exhibit good growth rates (Figure 5). The asymptotic growth rates show the fish getting bigger with age. Program biologists then plotted a length-frequency graph (Figure 6) to show the catch composition of the gill net. The size distribution of fish were most noticeable in the 25 to 39 cm fork length range.

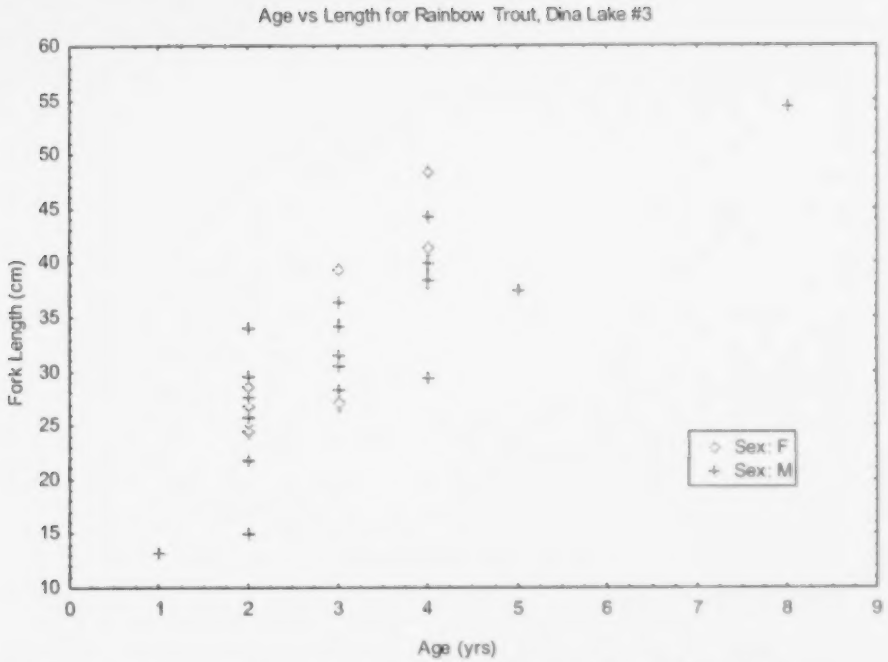

Figure 5. Age versus length of rainbow trout in Dina Lake # 3, 2001.

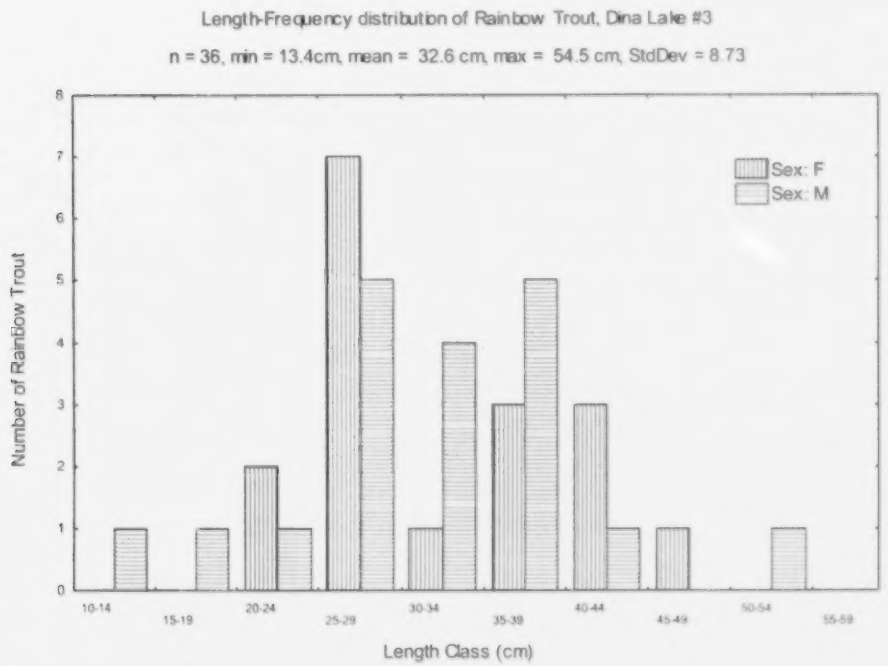

Figure 6. Length-frequency distribution of rainbow trout in Dina Lake # 3, 2001.

The power function was used to examine the fish's body shape (i.e. weight-length data). This function ($W = aL^b$) provides a description on how robust a fish is based on body shape (Figure 7). A "b" value greater than 3.0 represents a fish that becomes more rotund as length increases.

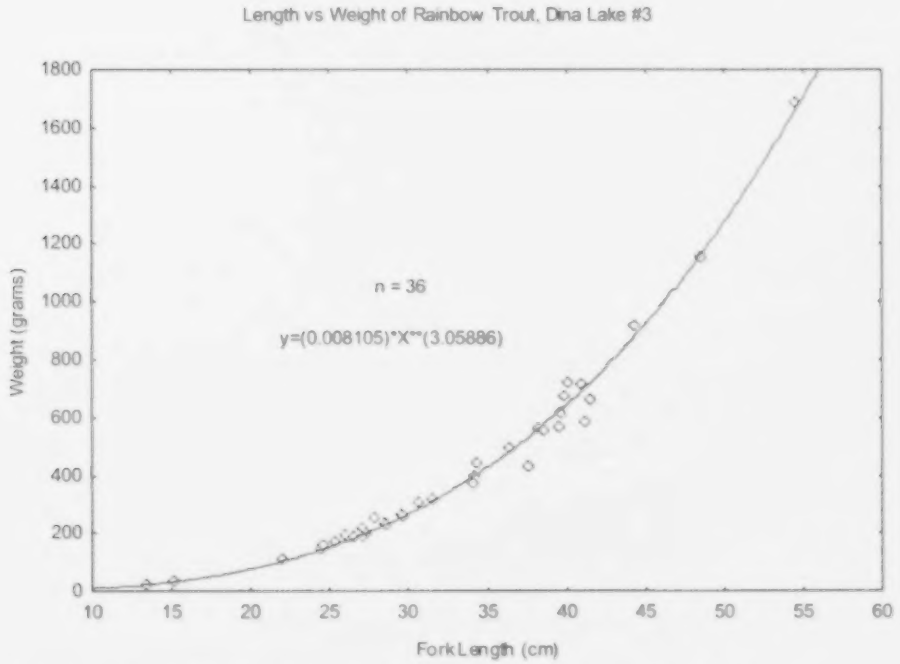

Figure 7. Length versus weight of rainbow trout in Dina Lake # 3, 2001.

The change in weight as a function of length is described by the equation Weight (g)= 0.008105 x Length (mm) $^{3.05}$, suggesting that Dina Lake #3 fish exhibit growth that is close to being isometric. There were no significant differences between sexes (17 females, b = 2.96; 19 males, b = 3.07). These females are becoming slightly less rotund as length increases while the males become a little more rotund when their length increases.

Gee Traps

Two Gee traps were used to capture juvenile fish. The traps were set overnight (Figure 2) for a minimum of 23 hours. The Gee traps produced only lake chub and no juvenile rainbow trout were captured (Table 5).

Table 5. Gee trap results, 2001.

Trap No.	Hours fished	Depth (m)	Substrate	Species	Number	Size Range (mm)
1	23.5	0.79	aquatic plants	lake chub	92	45 -110
2	23.5	0.88	cobble/ aquatic plants	lake chub	76	44 -105

Dip Netting

Recruitment of rainbow trout was examined in the inlet stream. An electroshocker was originally going to be used but small dip nets proved to be a more effective capture technique. The first 100 meters of the inlet was observed. The average channel wetted width was 0.5 m and the average depth was 5 cm. The average flow was estimated at 0.3 m/sec but varied throughout the channel. The water temperature was 5° C.

Juvenile fish were observed and caught with the dip nets (Table 6). The rainbow trout caught were sampled and measured for fork length and weight. The average length was 27.4 mm and the average weight was 0.21 grams. An additional 20 young-of-the-year (y-o-y) rainbow trout were observed but not captured.

Table 6. Summary of rainbow trout caught dip netting the inlet creek, Dina # 3, 2001.

Fish #	Length (mm)	Weight (g)
1	27	0.2
2	28	0.2
3	29	0.3
4	27	0.2
5	27	0.2
6	28	0.3
7	29	0.2
8	26	0.1
9	27	0.2
10	26	0.2

Angling

On September 19 and 20, Program fish biologists angled for 1 hour each day using two rods. Fishing effort on September 19 yielded four rainbow trout and on September 20 yielded one rainbow trout. The combined CPUE was 1.25 fish per rod hour.

In addition to the angling data of the Program biologists, two local residents (belly boating) were present at the time of this assessment. There were a total of 3 rods fishing (one angler had two rods) for 1.5 hours and yielded 6 fish. Catch per unit effort was 1.3 fish per rod hour.

BIOLOGICAL ANALYSIS OF RAINBOW TROUT

A biological analysis was conducted on 36 rainbow trout (Appendix 2). Nineteen of the fish caught were males and seventeen fish were females. Reproductive organ analysis revealed that 1 of the fish was a mature female, 19 were maturing (11 male / 8 female) and 16 were immature (8 male / 8 female). One female was noted as being spawnbound.

Examination of stomach contents suggest that rainbow trout are preying primarily on zooplankton. Other common foods included *Trichoptera* and *Gammarus* species. External examination indicated healthy fish with the exception of two fish that had evidence of black spot disease. Internal examination revealed tapeworms in two fish and flatworms present in one other. Lake chub were externally examined and a high infestation of black spot disease was also noted.

LIMNOLOGY

A limnology station was established at the deepest part of the lake (Figure 2) and a profile was completed on September 19, 2001 at 1118 hours. Weather conditions were 100% overcast with a slight breeze. Water temperature and dissolved oxygen measurements were recorded (Table 7). Oxygen levels were adequate for fish from the surface to 8 m in depth while the temperature was sufficient throughout the entire water column.

Table 7. Oxygen/temperature profile for Dina Lake # 3, September 19, 2001.

Depth (m)	Dissolved Oxygen (O_2)	Temperature (degrees Celsius)
Surface	9.1	13.7
1.0	8.8	13.8
2.0	8.8	13.9
3.0	8.9	13.9
4.0	8.5	13.8
5.0	8.4	13.8
6.0	8.2	13.7
7.0	7.5	13.5
8.0	5.2	12.8
9.0	0.4	10.7
10.0	0.4	8.8
11.0	0.3	7.6
11.5	bottom	bottom

DRAINAGE

Dina Lake # 3 has one inlet and contains no outlet. The mouth of this inlet was choked full of debris causing a barrier to rainbow trout migrating upstream. This small inlet appears to carry a lot of sand/silt (possibly from the road passage upstream). This material eventually forms an alluvial fan at the mouth, thus making the flow undetectable by spawning fish within the lake. Therefore, it is quite important that the mouth of this creek remain open (deep enough) for the spawning fish to utilise.

BENCHMARK

The original benchmark (1992) was located, but the tree appeared to be dead. Therefore, Program biologists established a new benchmark (not painted orange) on the same shore (Figure 2). The benchmark is located 1.8 m from the water's edge and is roughly 7 m west of the hiking trail. The new iron spike was set at 2.0 m above current water level and in a 39 cm diameter white spruce tree. Since the new benchmark was set in close proximity of the hiking trail, it was not painted orange there by reducing the chance of future vandalism.

FISHERIES MANAGEMENT COMMENTS

Rainbow Trout

Dina Lake #3 supports a healthy population of stocked rainbow trout; however, the number of fish captured in the overnight net set appears quite low for the number of fish stocked each year. Angling pressure on this lake is presumed high and may have removed a substantial portion of the stocked fish over time. Any future surveys (creel or aerial) will aid in determining the amount of angling pressure on this lake.

The average condition of fish captured in Dina Lake #3 appears adequate (C.F. = 1.02). These fish are relatively healthy and showed no obvious signs of stunting. These results are similar to other lakes in the area. Dina Lake #7 was also assessed in 2001 and the average condition factor for the 37 fish sampled was 1.03.

Access to the only inlet creek during each spring is crucial. If these fish do not have access, then they may eventually become spawnbound. Special attention should be made during the next assessment to examine this situation. Program biologist do spend one day each spring ensuring access to this creek by opening up the mouth for access. If access becomes a problem in the future, then stocking with a sterile strain of fish should then be considered.

The recruitment from the stream is providing additional fish to the lake. While the amount of recruitment from these spawning fish is unknown, the addition of these extra fish to the lake does not appear to be effecting the overall population (i.e. stunting). The naturalization from the creek is helping to reduce the overall costs to the stocking program and is providing for a adequate recreational fishery. Fish are obtaining sizes over 1.6 kg. Should there be a lack of any large size fish (> 1.0 kg) in the next assessment, then additional consideration should be given to reducing the number of fish being stocked within the lake to maintain these larger sized fish.

Non-game fish

Dina Lake #3 also supports a population of lake chub. Although not studied intensively, lake chub populations were abundantly caught in Gee traps. Of the 169 lake chub caught, a high infestation of black spot disease was noted. Since access to the only spawning stream available to these fish may be limited during mid-summer, these fish have had no choice but to spawn in a

possibly less-preferred lake habitat. These non-game fish do thrive in other lakes where stream spawning habitat is absent suggesting they can reproduce within lakes.

MISCELLANEOUS COMMENTS

1. A fisheries management plan encompassing all ten of the Dina Lakes chain was produced by Duane A. Jesson, BC Environment Fisheries Branch, Prince George, BC in February 1992.

2. Photographs of Dina Lake # 3 were taken of some fish species and the surrounding habitat. Most photos were taken to document the change in features over time (i.e. habitat) and are not significant to the relevance of this report on fish stocking. Therefore, photos are not displayed in this fish stock assessment report but can be viewed at the address indicated at the beginning of this report.

FISH STOCKING PROGRAM

The current rainbow trout stocking program in Dina Lake # 3 appears to be sufficient but there are still a few questions that remain to be answered. Recruitment and angler use are unknown.

The amount of natural recruitment produced by the inlet creek in any given year has not been examined. It would be possible to put a small fish fence up near the mouth to count entering adults. From this data, one could extrapolate and determine an estimated number of y-o-y returning to the lake. However, based on the time and money constraints to complete this task, setting up a fence is not warranted at this time. In addition, trying to quantify the adult mortalities due to bears would be impossible.

An accurate count of angler use on Dina Lake #3 is also difficult to know with any certainty and a future creel survey may be warranted. A winter fishery also exists on this lake but is unknown as to what extent. The number of anglers and their CPUE is not known. While on the ground creel surveys can be expensive, one possible solution would be to conduct an aerial boat count on this lake as identified by the Provincial Small Lakes Index Management Program (SLIM).

Another more economical way to determine the CPUE would be to conduct a limited creel survey during high use periods (i.e. long weekends). This survey may be a more cost effective means to obtain CPUE data without having to conduct a full creel survey. Future data collection and anecdotal information received will provide a better idea of the angler use/CPUE and would assist with the future stocking recommendations for Dina Lake #3.

The fishery created in Dina Lake #3 is currently successful. Based on the information collected with this survey, it is recommended that the stocking frequency (2,500 fish every second year) be maintained. After 2 stocking cycles are completed (2002 and 2004), it is recommended that the next assessment should take place in 2005 (a non stocked year). This way, no recently stocked fish will be inadvertently captured. In addition, special attention should be made to determine if any future spawnbound problems arise.

LITERATURE CITED

Lentsch, L.D. and J.S. Griffith. 1987. Lack of first-year annuli on scales: Frequency of occurrence and predictability in trout of the western United States. The Iowa State University Press, Ames, Iowa 50010. Pages 177–188.

McLean, A.R. 1991. A reconnaissance survey of Dina Lake # 3. Peace/Williston Fish and Wildlife Compensation Program, Prince George, BC, Report No.105. 21pp plus appendices.

Jesson, Duane A. 1992. Fisheries management plan for the Dina Lakes. BC Environment, Fisheries Branch, Prince George, BC 18pp plus appendices.

APPENDIX 1

Netting Record

NETTING RECORD **September 19, 2001**

Mesh sizes experimental order: 25, 76, 51, 89, 38, 64 mm

NETTING SITE #1

Type:	Sinking monofilament gill net		
Date Set:	September 19, 2001	Time:	1000hrs
Date Lifted:	September 19, 2001	Time:	1540 hrs
Net Dimensions:	Length: 91.4 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm	Depth: Substrate:	1.2 m organics/LWD
Deep End Mesh Size:	64 mm	Depth: Substrate:	10.5 m unknown

Comments:

Net was checked at 1400 hrs on September 19/01. Caught 12 RB. Pulled and reset net. Pulled again at 1540 with 2 RB caught. Did not reset. Gill net # 1 produced 14 RB.

Mesh sizes: 19 mm, 1 panel

NETTING SITE #2

Type:	Sinking monofilament gill net		
Date Set:	September 19, 2001	Time:	1138 hrs
Date Lifted:	September 20, 2001	Time:	0940 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	19 mm	Depth: Substrate:	8.0 m unknown
Deep End Mesh Size:	19 mm	Depth: Substrate:	9.0 m unknown

Comments:

Net was checked September 19 at 1410 hours: no fish caught; reset in slightly shallower water. Net pulled Sept 20; caught 1 RB and 1 lake chub. Net not reset. Gill net # 2 produced 1 RB and 1 lake chub.

NETTING RECORD **September 20, 2001**

Mesh sizes experimental order: 25, 76, 51, 89, 38, 64 mm

NETTING SITE # 3

Type:	Sinking monofilament gill net		
Date Set:	September 20, 2001	Time:	0953 hrs
Date Lifted:	September 20, 2001	Time:	1338 hrs
Net Dimensions:	Length: 91.4 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm	Depth: Substrate:	1.2 m organics/ LWD
Deep End Mesh Size:	64 mm	Depth: Substrate:	10.5 m unknown

Comments:

Same set location as Sept 19 set. Net pulled at 1338 hours; 4 RB caught. Net not reset. Gill net # 3 produced 4 RB.

Mesh sizes experimental order: 25, 76, 51, 89, 38, 64 mm

NETTING SITE # 4

Type:	Sinking monofilament gill net		
Date Set:	September 20, 2001	Time:	1003 hrs
Date Lifted:	September 20, 2001	Time:	1355 hrs
Net Dimensions:	Length: 91.4 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm	Depth: Substrate:	1.6m cobble/LWD/ organics
Deep End Mesh Size:	64 mm	Depth: Substrate:	7.6m unknown

Comments:

Net pulled at 1355 hours; caught 6 RB. Net not reset. Gill net set # 4 produced 6 RB.

APPENDIX 2

Individual Fish Data

Dina Lake # 3

INDIVIDUAL FISH DATA

Date Captured: September 19, 2001
Gill Net # 1 + Angling

M - Male
F - Female
? - Not Obvious

IMM - Immature
MG - Maturing
MT - Mature
GV - Gravid
SP - Spent
? - Not Obvious

EG - Egg
ML - Milt
HD - Head
TG - Fish Tag
ST - Stomach

SC - Scale
FR - Fin Ray
OT - Otolith
WF - Whole Fish

Method of Capture: Sinking monofilament gill net.
Condition Factor (K) = $W / L^3 \times 100$

Species	Fork Length (cm)	Weight (grams)	Condition Factor	Gonadal Maturity	Sex	Sample Type	Age (yrs)	Stomach Contents				Comments
								Plankton	Insects	Fish	Other	
RB	24.4	147	1.01	IMM	F	SC	2	zooplankton	worm			1st set of GN # 1
RB	40.9	716	1.05	MG	F	SC	4					1st set of GN # 1
RB	38.2	562	1.01	Full of eggs	F	SC	4	zooplankton			detritus wood	spawnbound
RB	38.5	554	0.97	MG	M	SC	4					empty
RB	28.4	237	1.03	IMM	M	SC	3	zooplankton	dragonfly nymph			
RB	34.2	400	1.00	MG	M	SC	3		winged insects			
RB	27.0	219	1.11	MG	F	SC	3	zooplankton	worm			
RB	27.2	201	1.00	IMM	F	SC	3	zooplankton	worms	shrimp		
RB	29.5	269	1.05	IMM	M	SC	4	zooplankton				
RB	25.9	197	1.13	MG	M	SC	2	lots zooplankton	worms			
RB	30.6	306	1.07	IMM	M	SC	3	zooplankton			detritus	tapeworm parasite
RB	28.6	230	0.98	IMM	F	SC	2		worms			
RB	26.8	193	1.00	IMM	F	SC	2	zooplankton	worms			black spot disease
RB	54.5	1688	1.04	MG	M	SC	8					empty
RB	37.5	430	0.82	MG	M	SC	5	zooplankton		? insects		angled
RB	39.6	615	0.99	MG	M	SC	4					Angled; empty
RB	27.8	254	1.18	MG	M	SC	2		dragonfly nymph			Angled; full
RB	34.3	442	1.10	MG	F	SC	3		flatworm parasite			Angled; empty

Ch.	chaoborus	P.M.	phantom midge	T.W.	tapeworms	Da.	daphnia
Cl.	clams	O.M.	organic matter	S.	snails	Di.	diptera
G.	gammarus	L.	lice	M.	mayflies (general)	Ca.	callibaetis
Le.	Leeches						

Dina Lake # 3

INDIVIDUAL FISH DATA

Date Captured: September 20, 2001
Gill Net # 2-4 + Angling

M - Male
F - Female
? - Not Obvious

IMM - Immature
MG - Maturing
MT - Mature
GV - Gravid
SP - Spent
? - Not Obvious

EG - Egg
ML - Milt
HD - Head
TG - Fish Tag
ST - Stomach

SC - Scale
FR - Fin Ray
OT - Otolith
WF - Whole Fish

Method of Capture: Sinking monofilament gill net.
Condition Factor (K) = $W / L^3 \times 100$

Species	Fork Length (cm)	Weight (grams)	Condition Factor	Gonadal Maturity	Sex	Sample Type	Age (yrs)	Stomach Contents				Comments
								Plankton	Insects	Fish	Other	
RB	24.5	158	1.07	IMM	F	SC	2	zooplankton				GN # 2
RB	26.5	192	1.03	IMM	F	SC	2	zooplankton				GN# 3; black spot disease
RB	25.3	173	1.07	IMM	F	SC	2	zooplankton	worms			GN# 3
RB	27.0	189	0.96	IMM	F	SC	2	zooplankton				GN# 3
RB	41.1	584	0.84	MG	F	SC	4	zooplankton	dragonfly nymph			GN# 3
RB	15.1	35	1.02	IMM	M	SC	2	zooplankton	Worms			GN # 4
RB	21.9	114	1.09	IMM	M	SC	2	zooplankton	? insect			GN # 4
RB	13.4	22	0.91	IMM	M	SC	1	zooplankton				GN # 4
RB	36.4	497	1.03	MG	M	SC	3	zooplankton	beetle/fly/winged insect			GN # 4
RB	39.5	566	0.92	MG	F	SC	3	zooplankton		clam/ shrimp	snail	GN # 4
RB	40.0	725	1.13	MG	M	SC	4	zooplankton			snails	GN # 4
RB	34.1	371	0.94	MG	M	SC	2		winged insect		detritus leaf	angled
RB	41.5	666	0.93	MG	F	SC	4	zooplankton	dragonfly nymph	leech	detritus	Angled
RB	39.8	676	1.07	MG	F	SC	4	zooplankton	dragonfly nymph caddis/worms	leech		Angled
RB	44.3	920	1.06	MG	M	SC	4	zooplankton	worm	shrimp		Angled
RB	31.5	317	1.01	IMM	M	SC	3	zooplankton				Angled
RB	29.6	260	1.00	IMM	M	SC	2					Angled; empty
RB	48.5	1155	1.01	MG	F	SC	4					Angled; some eggs from last yr; empty; tapeworms

Ch. chaoborus
Cl. clams
G. gammarus
Le. Leeches
P.M. phantom midge
O.M. organic matter
L. lice
T.W. tapeworms
S. snails
M. mayflies (general)
Da. daphnia
Di. diptera
Ca. callibaetis

AGE DETERMINATION

COMPLETED BY:

North/South Consultants
83 Scurfield Blvd.
Don Macdonel and Paul Graveline
Winnipeg, Manitoba, R3T 1G4

and

Arne Langston
Peace/Williston Fish and Wildlife Compensation Program
1011, 4th Ave.
Prince George, BC V2L 3H9